REMARKS/ARGUMENTS

Claim 11 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claim 11 has been amended herein to recite that the film thickness of the group I-VII semiconductor crystal thin film is the combination of the layer formed while irradiating the electric bean thereon and the layer formed while not irradiating the electric bean thereon. This amendment to claim 11 should obviate the rejection under 35 U.S.C. §112, second paragraph.

Claims 1, 3-8 and 10-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Williams et al. publication in view of the Yakshin et al. and Taniguchi et al. patent application publications; and claims 2 and 9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Yakshin et al. and Taniguchi et al. patent application publications. In view of the amendments to the claims herein and the reasons set forth hereinafter, it is requested that the Examiner reconsider and withdraw these rejections.

A significant feature of the present invention is that the group I-VII semiconductor single crystal thin film (CuCl film in the Examples) of single composition is made up of the combination of the layer formed while irradiating the electron beam thereon and the layer formed while not irradiating the electron beam thereon.

This feature is specifically recited in claims 1, 2, 8 and 9, as amended herein, and all of the claims depending therefrom. None of the references cited by the Examiner, taken individually or in combination, discloses or even suggests this significant feature of the present invention, as now recited in all of the claims.

Williams et al. teaches a group I-VII semiconductor crystal thin film formed on a substrate made from ionic crystals, the film being formed on a buffer layer while a beam is irradiated on the film. The Examiner recognizes that Williams et al. does not teach the beam to be an electron beam, does not teach the semiconductor film to be a single crystal, and does not teach the combination of a layer formed while irradiating the electron beam thereon and a layer formed while not irradiating the electron beam thereon.

Yakshin et al. teaches in paragraph 37 that certain stages of thin film growth, especially when fabricating multilayers, can be done with electron beam evaporation to benefit from high multilayer activities achieved with e-beam deposition, and also that electron beam evaporation has the advantage of producing high quality films without intermixing with underlying layers. It is noted, however, that the processes disclosed in Yakshin et al. are not for producing a film of single composition and that it is natural to understand that such processes are for the fabrication of films of different kinds of composition. Accordingly, Yakshin et al. fails to supply the deficiencies of Williams et al. with respect to the novel recitations in the claims as amended herein.

Taniguchi et al. teaches in paragraphs 6 and 7 that a polysilicon layer has a higher electron mobility than that of amorphous silicon and that, although the polysilicon is formed of an aggregation of one-crystal grains, its electron mobility is lower than that of single-crystal silicon. This teaching fails to supply the deficiencies of the Williams et al. and Yakshin et al. references with respect to the novel recitations in Applicant's claims, namely, a group I-VII semiconductor single crystal thin film of single composition made up of a combination of a layer formed while irradiating the electric beam thereon and a layer formed while not irradiating the

electric beam thereon. Accordingly, all of Applicant's claims, as amended herein, should be allowable over the combined teachings of the Williams et al., Yakshin et al. and Taniguchi et al. references.

With respect to claims 13-15, the Examiner concedes that the cited references fail to teach the acceleration voltage of the electron beam in claim 13, the filament current of the electron beam in claim 14 or the irradiation current of the electron beam in claim 15. The Examiner states that it would have been obvious to one of ordinary skill to determine the optimum acceleration voltage, filament current and irradiation current, and that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. It is submitted that the Examiner is in error in this conclusion.

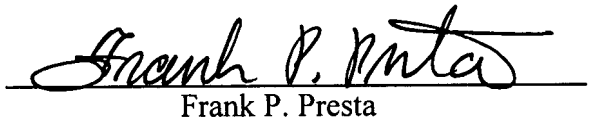
First, it is noted that the electron beam parameters defined in claims 13-15 produce a group I-VII semiconductor single crystal thin film that is improved in planarity and that this improvement cannot be attained by the apparatus or methods disclosed in the cited references.

Second, it is noted that the critical nature of the claimed ranges and unexpected results arising therefrom are set forth on pages 17 and 18 of the specification (Example I) wherein it is clearly stated that if the acceleration voltage HV is higher than 30kV, if the film in current F1 is greater than 5A, or if the irradiation current HI is greater than 150uA, the electron beam irradiation would cause the resulting film to be poor in quality, thereby resulting in poor planarity. It is further noted that these recited conditions make it possible to produce a film that is excellent in planarity. Accordingly, claims 13-15 are clearly allowable over the teachings of the cited references.

In view of the above amendments and remarks, all of the claims in the present application, as amended herein, should be allowable to Applicants. Formal allowance of all of the claims, therefore, is earnestly solicited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 

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